



***Status Report:  
Physics of the Cosmos PAG  
(PhysPAG)***

**John Nousek**  
*Penn State University*

***223<sup>rd</sup> AAS Meeting, National Harbor, MD  
7 February 2014***

# Talk Overview

*Physics of the Cosmos  
Program Analysis Group  
(PhysPAG)*

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*Executive Committee*

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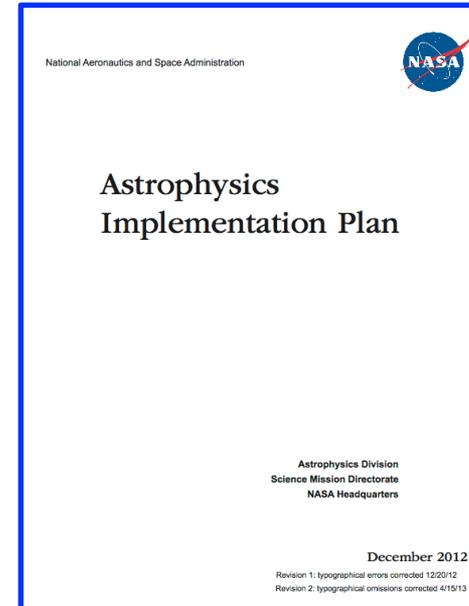
*Reports from  
Science Interest Groups  
(5 Jan 2014 sessions)*

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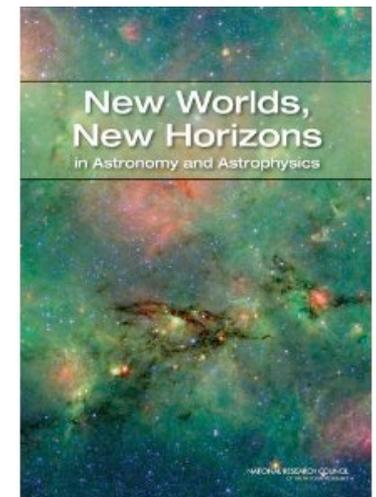


# ***Physics of the Cosmos (PCOS): Scientific and Technical Stewardship for future missions***

- ◆ Provide scientific and technical stewardship for decadal-survey recommended missions within the framework of the Astrophysics Implementation Plan:
  - Of the six highly-ranked large and medium space-based priorities in NWNH, THREE fall within the PCOS science program:
    - LISA
    - IXO
    - Inflation Probe (medium-scale)
  - NOTE: WFIRST is located within the Exoplanet Program and the science of dark energy is within PCOS



**See also the PCOS Website:**  
***[pcos.gsfc.nasa.gov](http://pcos.gsfc.nasa.gov)***



## *PhysPAG: Input from Community to NASA*

- ◆ **The Physics of the Cosmos Program Analysis Group (PhysPAG) serves as a community-based forum for providing feedback to NASA on PCOS-related topics, including objectives and architecture planning, and recommendations for activity prioritizations.**
- ◆ **PhysPAG formally presents findings of its analyses to NASA SMD through the NASA Advisory Council (NAC).**
- ◆ **An Executive Committee (EC) consisting of interested individuals selected by NASA HQ coordinates and supports PhysPAG activities (see next slide)**

**ALL interested individuals of the community at large are invited to be part of the PhysPAG.**

**Sign up at [pcos.gsfc.nasa.gov](https://pcos.gsfc.nasa.gov)**

# Evolution of Executive Committee

- ◆ **Structure of PhysPAG Executive Committee evolving to provide better continuity and larger outreach**
- ◆ **Each EC member will serve for three years**
  - First year will serve as Vice Chair
  - Second year as Chair
  - Third year as *ex officio*
- ◆ **New EC members appointed at end of 2013**
- ◆ **Jamie Bock (JPL) is new Vice PhysPAG Chair**
- ◆ **New Executive Committee members:**
  - Mark Bautz, MIT, XR-SIG
  - Neil Cornish, Montana State, GW-SIG
  - Mark McConnell, UNH, GammaSIG
  - Eun-Suk Seo, UMD, Cosmic Ray SIG
  - Rachael Bean, Cornell, Dark Energy
  - Jamie Bock, JPL, Inflation Probe SIG

# PhysPAG Executive Committee

| Name             | Affiliation            | Expertise           | Term Expiration Date |
|------------------|------------------------|---------------------|----------------------|
| J. Nousek, Chair | Penn. State Univ.      | X-rays              | January 2015*        |
| J. Bookbinder    | SAO                    | X-rays              | December 2015        |
| M. Bautz         | MIT                    | X-rays              | December 2016        |
| S. Hanany        | Univ. of Minnesota     | CMB, suborbital     | December 2014        |
| J. Bock          | Caltech/JPL            | CMB, suborbital     | December 2016        |
| G. Muller        | Univ. of Florida       | Gravitational Waves | December 2014        |
| N. Cornish       | Montana State Univ.    | Gravitational Waves | December 2016        |
| J. Rhodes        | JPL                    | Dark Energy         | December 2014        |
| R. Bean          | Cornell                | Dark Energy         | December 2016        |
| A. Olinto        | Univ. of Chicago       | Astroparticles      | December 2015        |
| Eun-Suk Seo      | Univ. of MD            | Astroparticles      | December 2016        |
| L. Hays          | GSFC                   | Gamma-rays          | December 2014        |
| M. McConnell     | Univ. of New Hampshire | Gamma-rays          | December 2016        |

\*Term to be extended 1 year as *ex officio* member until December 2015

- **Two representatives for various PCOS areas of expertise**
- **Staggered terms to ensure continuity at any time**
- **Chair is a member of the NAC APS**

# *The PhysPAG Science Interest Groups (SIGs)*

- ◆ **Inflation Probe Science Interest Group (IPSIG)**
- ◆ **Gravitational Wave Science Interest Group (GWSIG)**
- ◆ **X-ray Science Interest Group (XRSIG)**
- ◆ **Gamma-ray Science Interest Group (GammaSIG)**
- ◆ **Cosmic Ray Science Interest Group (CosmicSIG)**
  
- ◆ *A previous SAG on Technology (closed)*

**See** <http://pcos.gsfc.nasa.gov/physpag>

# ***Inflation Probe Science Interest Group (IPSIG)***

## IPSIG

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- Submitted the first technology development plan (2011) toward a future space mission
  - Defined three areas of specific emphasis: detectors, optics, coolers
  - Out of 13 SAT grants 2012 - 2014, 2 are in CMB (1/1 in 2014), both in detector technology
- Advocated (without much success) for a new mission study prior to a mid-decade review
- Supported European colleagues in ESA mission-concept submissions: CORE (M-class), PRISM (L-class)
- Organized several CMB special sessions at the AAS (See Last Slide)
- Supported CMB-S4, a 'Stage 4' ground-based experiment with 250,000 detectors
- Interested in NASA's plans post ESA L2/L3 selections

## Moving towards the future

### Pathfinder:

- Launch in 2015
- Results in 2016

### Advanced LIGO:

- Science runs start in 2015
- First detection 2016–2018

Technical readiness

Scientific pressure

Not a mission yet. We have to be open minded:

- ESA-L3 is one option
- NASA-led is another option
- Different partners (JAXA, Nationals in Europe, ...)
- NSF, DOE?? Is this completely crazy? (Q2C)

# ***XRSIG Poll of US Athena+ Interest***

- ◆ **Jay Bookbinder polled the XRSIG to identify potential US contributions**
- ◆ **Topics identified:** (in no order, also either whole or partial)
  - X-ray optics
  - Hard X-ray telescope
  - Calorimeter
  - Grating spectrometer
  - Wide Field Imager
  - Moveable Instrument Platform (MIP)
  - Calibration support
  - Science analysis & Simulation software
  - Filter technology/ Filters

## Future Gamma-ray Science

- Interest in GammaSIG to organize a workshop on a the next MeV instrument
  - Seeking consensus within the U.S. gamma-ray community on science goals and technical approaches
  - Forming a core committee within GammaSIG to organize this effort
  - Anticipated output of the meeting is a document summarizing the community view on science objectives and technical priorities

## CosmicSIG Activities

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- ▶ Gathering input from Community
  - ▶ “June 2012”: open meeting at CR2012 requesting input from the community
  - ▶ Teleconferences and email input for further information gathering.
  - ▶ ICRC 2013
- ▶ Fall 2013: compile previous white papers (Astro 2010 prep to NWNH, *Enduring Quests Daring Visions*,...).
- ▶ Winter 2014: draft white paper
- ▶ April 2014: present white paper draft at APS meeting
- ▶ Fall 2014: deliver white paper to PhysPAG (+ NAC)